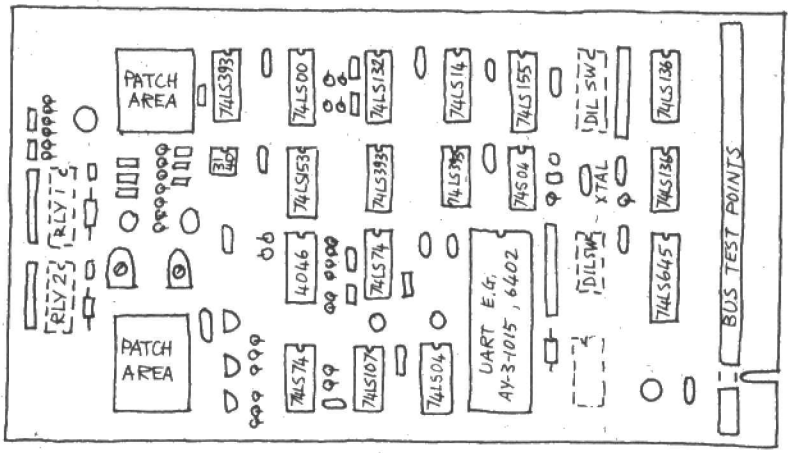
Document Ref: DTI1-BDS
Issue No: 1. July 1982

Greenbank Electronics
Telephone: 051-645 3391

Interak 1

DUAL TAPE INTERFACE

Dual Tape Interface with Motor Control



Dual Tape Interface with Motor Control

FEATURES

* Drives One or Two Audio Cassette Machines.
* Gives Good Results with Ordinary Domestic Quality Cassette Tapes and Drives.
* Software On/Off Motor Control via Relays.
* 300/1200/2400 Baud Rates (600 baud available).
* Crystal-controlled Baud Rates.
* Uses Phase-locked Loop to Cope with Minor Tape Speed Variations.
* Can Load and Dump CUTS (Kansas City) Standard Cassettes.
* International Size Card (4.5" x 8").
* Plated-through Holes, Epoxy-glass PCB.
* Green Solder Resist on "A" side.
* Gold-plated 0.1" Pitch Edge Connector on Both A and B Sides.
* 5V Only Operation.
* Uses Two I/O Ports (No Memory Space Needed).
* ISBUS-A, INTERAK 1 bus compatible.
* KBUS-5, KBUS-12 Compatible.
* Buffered Where Necessary to Reduce Bus Loading to 1 Load per Line.
* No Manufacturer's Name Appears on the Card, thus Ideal for OEM Use.

DESCRIPTION

The Dual Tape Interface Card is the interface between the user's standard audio cassette machine and the Interak 1 System. One or two machines can be used, and relays are provided on the card for the purpose of turning the cassette drive motors on and off.

The serial output is generated by a UART, the output of which can be directed to one of the two cassettes, at 300/1200/2400 baud, selected for example by a three position switch. (600 baud is available but not normally selected, as the other three rates are far more common).

Ideally of course a system should have both floppy disks and cassettes, but it is recognised that not all users will have the desire (or the funds!) for floppy disks, whereas they are almost certain to have the use of some sort of cassette recorder. Therefore, the system has been organised so that the use of tape cassettes now does not spoil the system when disks are added later. Users are encouraged to store their programs on cassettes rather than clutter up their systems with ROMs and EPROMs which become redundant when disks are added. The only penalty which a cassette user suffers is that it takes a little time to load programs from cassette. The ability of this interface to work at the maximum 2400 goes some way to minimise this inconvenience. It is suggested that two seven-pin DIN connectors are provided for connection to the cassette drive(s).

A bidirectional tranceiver buffer is used on this card to buffer the data bus. Two LEDs indicate which of the two drives are selected. A power-on reset circuit resets the UART, and turns both motor relays on (if fitted). This is so that tapes can be re-wound etc., and a second three position switch can be used to control the relays, the three positions being relays off, automatic (under software control), and relays on.

High Reliability/Data Integrity

Serial data from the cassettes are conditioned by the cassette card circuitry using a MOS/FET op-amp, a phase-locked loop, and a UART, to provide a parallel 8-bit byte for the computer. A quartz crystal is used for transmission and the recieved signal is demodulated using a "digital monostable". This means that no setting-up or test equipment is required. The circuit techniques used result in the interface having the maximum chance of coping whatever quality tape recorder you have. Bear in mind however that at the 2400 baud rate, the recorded data bits are spaced at intervals of around a fiftieth of a millimetre apart so it is obviously prudent to buy the very best machine and cassettes you can.

Port Space

This card does not encroach on the system memory space at all, since all transactions make use of just two Z80A I/O ports, one for the transmission and receipt of data bytes, and one for reading the UART Status and selecting which of the two drives is required. A special feature is that the Port Addresses are selectable by wire links or a DIL switch pack and are not preset permanently in the copper track. This means that more than one of the DTI cards could be used in the same system for some special purpose. (For example it is conceivable that a second interface could be used to transmit data along a telephone wire to another computer, as audio signal frequencies have been used. Note that it is probably illegal to do this on the public telephone network.)

General

All of the components used are readily available. The integrated circuits used are all laid out the same way round, which makes the card very straightforward to construct and test. Wherever possible signal tracks which have to pass between the legs of ICs are taken on the A-side so that they can be inspected in case of trouble. (Less considerate designers take them on the B-side where any shorts will be hidden under the IC sockets!) Plated-through hole construction is provided, and a solder resist mask on the A-side.

Although all of the signals are taken via the A-side of the 0.1" pitch edge connector (which is gold-plated) a gold-plated edge connector is also provided on the B-side.

CONTENTS OF KIT

The kit of components, which is sold separately to the p.c.b. itself includes 30+ resistors, 2 variable resistors, 25+ capacitors, 3 transistors, 1 4.9152 MHz crystal, 18 integrated circuits, 22 integrated circuit sockets (sockets included for some of the options, DIL switch and relays), and some 0.1" pitch pin assemblies. The kit provides only the minimum components necessary to make the interface work in an Interak 1 system. A 1" metal card front and the relays, LEDs, connectors and option switches are recommended but are not included in the kit to keep the basic cost down for those working to a limited budget.